Weekly Report – June 14, 2024

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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TRAVEL AND MEETING REPORTS

Patton Presents at the "Interactive Analysis of Tropical Storm Philippe" Virtual Workshop
Hosted by NOAA/WMO Region IV (North America, Central America, and the Caribbean) from 4–7 June 2024, the "Interactive Analysis of Tropical Storm Philippe" workshop focused on the many forecasting challenges posed by Philippe, which was particularly impactful with flash flooding and damage on islands in the Lesser Antilles. This workshop was also co-hosted by the Caribbean Institute for Meteorology & Hydrology. On 5 June, CISESS Scientist Joseph Patton presented an interactive session on using lightning observations from the Geostationary Lightning Mapper (GLM) to better understand the convective development of Tropical Storm Philippe (2023). Steve Goodman (GEO Earth Observation Program Office and Thunderbolt Global Dynamics) assisted Patton in the creation and administration of this presentation. In attendance were dozens of forecasters and researchers from institutions across the Caribbean. The presentation focused on the spatial extent and areal flash count, size, and brightness characteristics of lightning observations, which are unique capabilities of the GLM instrument. Forecasters and researchers at the workshop were encouraged to respond to interactive questions about the development of Philippe and GLM observations from individual storms which affected islands in the Lesser Antilles.

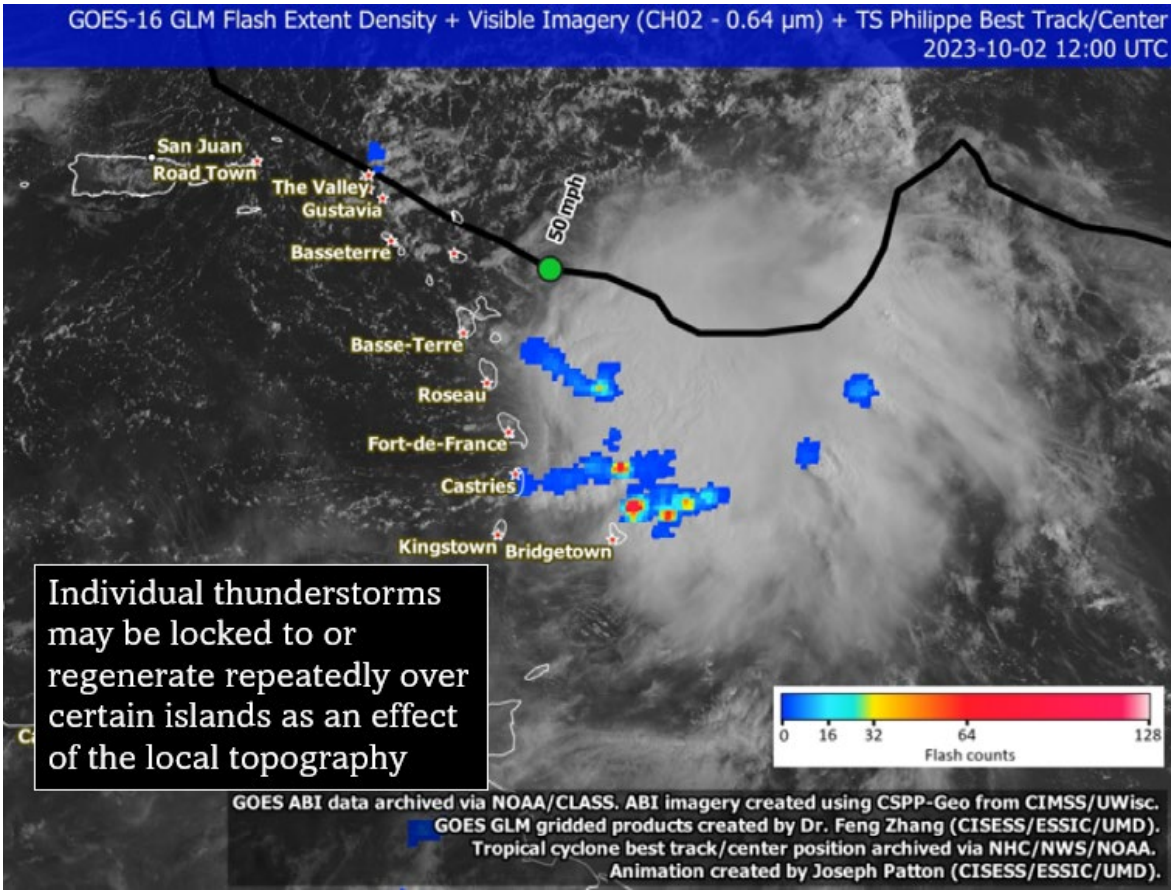

Figure: GOES-R ABI visible satellite imagery and GLM lightning flash counts during Tropical Storm Philippe (2023) as it approached the Lesser Antilles. Image credit: Joseph Patton (CISESS/ESSIC/UMD)

(Joseph Patton, CISESS, jpatton4@umd.edu, Funding: GOES-R AWG, GOES-R PGRR)

DC Lightning Mapping Array Site Visit to Johns Hopkins University

The DC Lightning Mapping Array (DCLMA) is an eight-station VHF radio antenna network that detects and geolocates lightning in the DC region. This network detects lightning with high detection efficiency and can be used to study lightning physics, for operational forecasting, and for intercomparison studies with the Geostationary Lightning Mapper. CISESS Scientist Guangyang Fang reported that on 10 June 2024, CISESS colleague Joseph Patton visited the DCLMA station at the Applied Physics Laboratory at Johns Hopkins University in Laurel, MD (Site 8 of the DCLMA) to assess the issue of a global positioning system (GPS) signal loss at the site. Upon inspection, Patton discovered that for some unknown reason, the GPS antenna coaxial

cable was severed at the base of the GPS antenna. The damaged GPS antenna was replaced with a new one during this visit. The GPS at Site 8 is now functioning properly.

Figure: Damaged GPS antenna (left) and new replacement GPS antenna (right) at the Applied Physics Laboratory, Johns Hopkins University. Image credit: Joseph Patton (CISESS/ESSIC/UMD)

(Guangyang Fang, CISESS, gfang@umd.edu, Funding: GOES-R AWG, GOES-R PGRR)

Wenhui Wang Presents at the 2024 Characterization and Radiometric Calibration for Remote Sensing Annual Meeting

The Characterization and Radiometric Calibration for Remote Sensing Annual Meeting was held in North Logan, UT from 10-13 June 2024. In the "Operational Sensor Inter-calibration and Validation" session on 11 June, CISESS Scientist Wenhui Wang presented on NOAA-21 Visible Infrared Imaging Radiometer Suite thermal emissive bands (TEB) on-orbit performance. TEB sensor data record (SDR) products have been available since 10 February 2023. Wang noted the following on-orbit changes: (1) A small degradation in the TEB detector responsivities was observed during early February 2023, with the longwave infrared (LWIR) bands exhibiting relatively larger degradations. The 23 February 2023 mid-mission outgassing successfully removed potential water ice contamination; (2) Cold focal plane array setpoint temperatures

were lowered from 82 K to 80 K on 3 March 2023 to enhance the TEB noise performance. LWIR noise-equivalent temperature differences were significantly reduced, while LWIR gains jumped by 4-11%; and (3) NOAA-21 mid-wave infrared (MWIR) bands started to degrade significantly since mid-March 2023, coincident with the even faster degradations in the shortwave infrared bands. The NOAA-21 TEB gains were successfully restored by the second mid-mission outgassing performed on 26 February 2024 and have been stable since then. NOAA-21 VIIRS TEB SDRs have been stable and agree well with co-located Cross-track Infrared Sounder observations. Scan angle/scene temperature dependent biases and warmup-cooldown biases in NOAA-21 TEB SDRs were also analyzed in detail. Updated calibration parameters were developed and successfully transitioned to operations to benefit downstream applications.

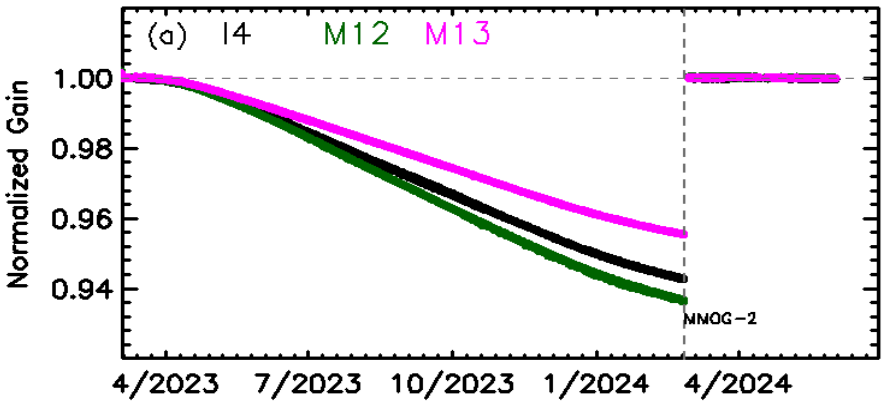

Figure: Impacts of the 26 February 2024 mid-mission outgassing on NOAA-21 VIIRS MWIR gains.

(Wenhui Wang, CISESS, whwang1@umd.edu, Funding: JSTAR)

Coral Reef Watch staff investigates refining the spatial resolution of satellite-based water quality monitoring products for coral reefs

NOAA Coral Reef Watch (CRW) team member, Erick Geiger, investigated the potential for higher-resolution ocean color satellite sensor data to enhance CRW's existing water quality monitoring products for coral reefs. CRW presently uses daily 750-m Visible Infrared Imaging Radiometer Suite data to produce chlorophyll-*a* (Chl-*a*), Kd490, and Chl-*a* Anomaly products for Puerto Rico and Hawaii coral reefs. Users have requested higher spatial- and temporal-resolution ocean color products to better monitor land-based sources of pollution and sediment plumes over their reefs. Mr. Geiger determined that Sentinel-3A and 3B hi-res sector-mapped Kd490 and Chl-*a* data (from CoastWatch) can be used to produce 300-m water quality monitoring products for Puerto Rico and Hawaii but with the following limitations: (a) Sector-mapped Sentinel data at 300 m are only available for 2024; and (b) increasing the spatial resolution does not address user needs for a more complete temporal resolution and data gap

coverage.

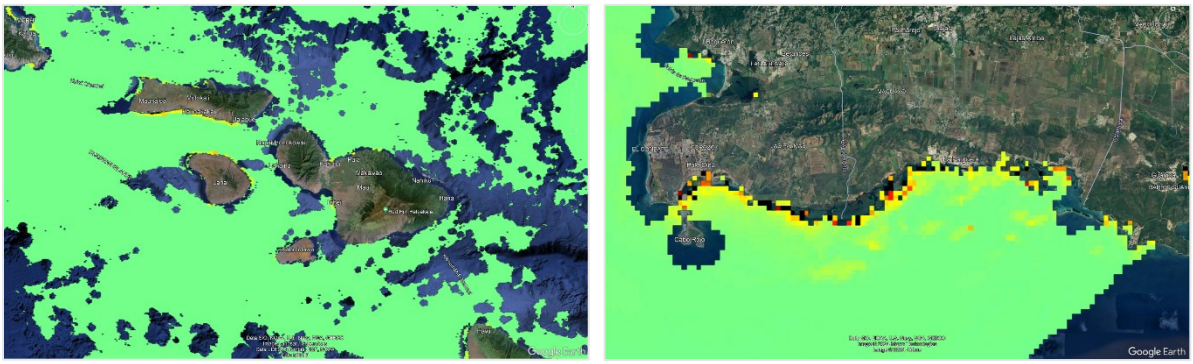

Figure: Example images of Chl-a concentration from Sentinel-3A for Maui, Hawaii (left) and La Parguera, Puerto Rico (right) at 300-m resolution, displayed in Google Earth.

(Jacqueline De La Cour, CISESS, jacqueline.shapo@noaa.gov, Funding: NOS; Erick Geiger, CISESS, erick.geiger@umd.edu, Funding: NOS)

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(Maureen Cribb, CISESS, mcribb@umd.edu, Funding: Task I)